Preoperative Thrombocytopenia is Associated With Increased Postoperative Complications in Total Joint Arthroplasty

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INTRODUCTION: Preoperative coagulation abnormalities, including thrombocytopenia, are routinely screened for and have been associated with bleeding, wound, and infectious complications in select populations. Platelets not only play a key role in hemostasis but also contribute to host defense through inflammatory and immune pathways. However, the impact of low preoperative platelet count on postoperative outcomes in the general TJA population remains unclear. This study aims to evaluate whether preoperative thrombocytopenia is independently associated with increased 90-day and 1-year complications in patients undergoing primary THA and TKA.

METHODS: We performed a retrospective cohort study using the TriNetX Research Network. The query was executed on June 7, 2025, to identify patients who underwent primary total knee arthroplasty (TKA) and total hip arthroplasty (THA) with a preoperative platelet count within three months of surgery and at least one year of follow-up. Patients were identified using a combination of Current Procedural Terminology (CPT) codes and International Classification of Diseases, Ninth and Tenth Revision (ICD-9/10) procedure codes. Patients were divided into two cohorts: 1) control group with platelet counts within the normal range (140,000–417,000/µL. 2) comparative group consisting of individuals with thrombocytopenia (platelet count <140,000/µL). Patients with malignant neoplasms of lymphoid, hematopoietic, or related tissue as well as those with a prior history of chemotherapy were excluded from both cohorts. Propensity matching was done in a 1:1 ratio using age, sex, ethnicity, BMI, atrial fibrillation and flutter, diabetes mellitus, obesity, chronic obstructive pulmonary disease, liver disease, essential hypertension, chronic kidney disease (CKD), rheumatoid arthritis (RA), systemic lupus erythematosus (SLE), and immune thrombocytopenic purpura (ITP) and most recent hemoglobin value.

RESULTS: A total of 13,621 matched patients were included (7,610 TKA; 6,011 THA). The average age and BMI were 67.4±8.8 years and 32.2±6.3 kg/m² in the TKA cohort, and 64.8±11.4 years and 29.6±6.18 kg/m² in the THA cohort. Thrombocytopenia was associated with significantly increased odds of multiple complications in both cohorts. In the total knee arthroplasty (TKA) cohort, patients demonstrated significantly increased odds of: surgical site infection (SSI) (adjusted odds ratio [aOR] 1.26, 95% confidence interval [CI] 1.01–1.59, $P = 0.044$), urinary tract infection (UTI) (aOR 1.24, 95% CI 1.02–1.51, $P = 0.0319$), acute kidney injury (AKI) (aOR 1.44, 95% CI 1.20–1.74, $P = 0.0001$), transfusion (aOR 1.79, 95% CI 1.51–2.13, $P < 0.0001$), deep vein thrombosis (DVT) (aOR 1.64, 95% CI 1.26–2.13, $P = 0.0002$), and periprosthetic joint infection (PJI) at one year (aOR 1.31, 95% CI 1.09–1.57, $P = 0.0039$). In the total hip arthroplasty (THA) cohort, the risk of UTI and DVT were not increased. However, similar to the TKA cohort, the THA group had increased odds of SSI (aOR 1.51, 95% CI 1.14–1.99, $P = 0.004$), AKI (aOR 1.31, 95% CI 1.08–1.58, $P = 0.005$), transfusion (aOR 1.72, 95% CI 1.49–1.99, $P < 0.0001$), and 1-year PJI (aOR 1.42, 95% CI 1.13–1.80, $P = 0.003$). Cardiopulmonary complications, such as myocardial infarction and arrhythmia, trended toward higher incidence in the THA cohort but did not reach statistical significance.

DISCUSSION AND CONCLUSION:
Literature has reported the prevalence of preoperative thrombocytopenia (platelet count <150,000) up to 7.3% and 8.3% in THA and TKA patients, respectively. Previous studies have examined associations between preoperative thrombocytopenia and postoperative TJA complications. but were limited by smaller sample sizes or short follow-up periods. Our study aligns with previous findings that preoperative thrombocytopenia is independently associated with increased risks of early complications in patients undergoing primary TKA and THA while expanding on its impact on 1-year PJI complication rates. These findings support incorporating platelet count into TJA risk stratification protocols and underscore the need for further studies to explore targeted perioperative management strategies in this population.

Total Hip Arthroplasty	Low Platelet N (%)	Normal Platelet N (%)	aOR	95% CI	P-Value
Superficial Infection	17 (0.288%)	21 (0.355%)	0.809	(0.426, 1.535)	0.5157
Deep Infection	≤10	≤10	—	—	—
SSI	**124 (2.098%)**	**83 (1.404%)**	**1.505**	**(1.137, 1.991)**	**0.0040***
UTI	197 (3.333%)	182 (3.080%)	1.085	(0.884, 1.332)	0.4335
AKI	**254 (4.363%)**	**196 (3.367%)**	**1.309**	**(1.083, 1.583)**	**0.0053***
Transfusion	**513 (8.680%)**	**309 (5.228%)**	**1.723**	**(1.489, 1.994)**	**<0.0001***
MI	73 (1.235%)	54 (0.914%)	1.356	(0.952, 1.932)	0.0901
PE	72 (1.218%)	56 (0.948%)	1.289	(0.908, 1.832)	0.1550
DVT	82 (1.387%)	84 (1.421%)	0.976	(0.718, 1.326)	0.8758
Pneumonia	104 (1.760%)	86 (1.455%)	1.213	(0.910, 1.618)	0.1880
Death	19 (0.321%)	23 (0.389%)	0.826	(0.449, 1.517)	0.5364
Stroke	60 (1.015%)	57 (0.964%)	1.053	(0.732, 1.516)	0.7804
HF	363 (6.142%)	353 (5.973%)	1.030	(0.886, 1.198)	0.6998
Arrhythmia	820 (13.875%)	758 (12.826%)	1.095	(0.985, 1.218)	0.0936
1-yr PJI	**172 (2.954%)**	**122 (2.095%)**	**1.422**	**(1.125, 1.799)**	**0.0031***

Table 2. Postoperative Complications in Total Hip Arthroplasty Stratified by Preoperative Platelet Count. Low platelet count defined as <140,000/μL and normal platelet count defined as 140,000–417,000/μL. aOR = adjusted odds ratio; SSI = surgical site infection; UTI = urinary tract infection; AKI = acute kidney injury; MI = myocardial infarction; PE = pulmonary embolism; DVT = deep vein thrombosis; HF = heart failure; PJI = periprosthetic joint infection.

Total Knee Arthroplasty	Low Platelet N (%)	Normal Platelet N (%)	aOR	95% CI	P-Value
Superficial Infection	19 (0.254%)	13 (0.174%)	1.463	(0.722, 2.964)	0.2883
Deep Infection	≤10	≤10	—	—	—
SSI	**171 (2.289%)**	**136 (1.82%)**	**1.263**	**(1.006, 1.586)**	**0.0435***
UTI	**228 (3.052%)**	**185 (2.476%)**	**1.240**	**(1.018, 1.509)**	**0.0319***
AKI	**274 (3.668%)**	**192 (2.570%)**	**1.443**	**(1.197, 1.741)**	**0.0001***
Transfusion	**363 (4.859%)**	**207 (2.771%)**	**1.792**	**(1.506, 2.132)**	**<0.0001***
MI	45 (0.602%)	55 (0.736%)	0.817	(0.550, 1.213)	0.3157
PE	82 (1.098%)	83 (1.111%)	0.988	(0.727, 1.343)	0.9376
DVT	**146 (1.954%)**	**90 (1.205%)**	**1.635**	**(1.255, 2.130)**	**0.0002***
Pneumonia	81 (1.084%)	69 (0.924%)	1.176	(0.852, 1.624)	0.3247
Death	23 (0.308%)	33 (0.442%)	0.696	(0.408, 1.186)	0.1806
Stroke	70 (0.937%)	66 (0.883%)	1.061	(0.757, 1.488)	0.7304
HF	444 (5.943%)	414 (5.541%)	1.077	(0.938, 1.236)	0.2915
Arrhythmia	975 (13.05%)	942 (12.609%)	1.040	(0.945, 1.145)	0.4195
1-yr PJI	**270 (3.614%)**	**208 (2.784%)**	**1.309**	**(1.089, 1.573)**	**0.0039***

Table 1. Postoperative Complications in Total Knee Arthroplasty Stratified by Preoperative Platelet Count. Low platelet count defined as <140,000/μL and normal platelet count defined as 140,000–417,000/μL. aOR = adjusted odds ratio; SSI = surgical site infection; UTI = urinary tract infection; AKI = acute kidney injury; MI = myocardial infarction; PE = pulmonary embolism; DVT = deep vein thrombosis; HF = heart failure; PJI = periprosthetic joint infection.